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**Seamans**

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(54) **LOCKING APPARATUS FOR A KEY HOLDER**

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(52) **U.S. Cl.** ..... **70/456 R**; 24/3.6; 70/459; 206/37.1; 401/52; 401/195; 403/322.1
(58) **Field of Search** ..... 70/456 R, 459, 70/460; 206/37.1, 37.8, 38.1; 24/3.6, 3.11, 324, 662; 401/52, 195; 403/315, 322.1, 325, 326, 329, 297

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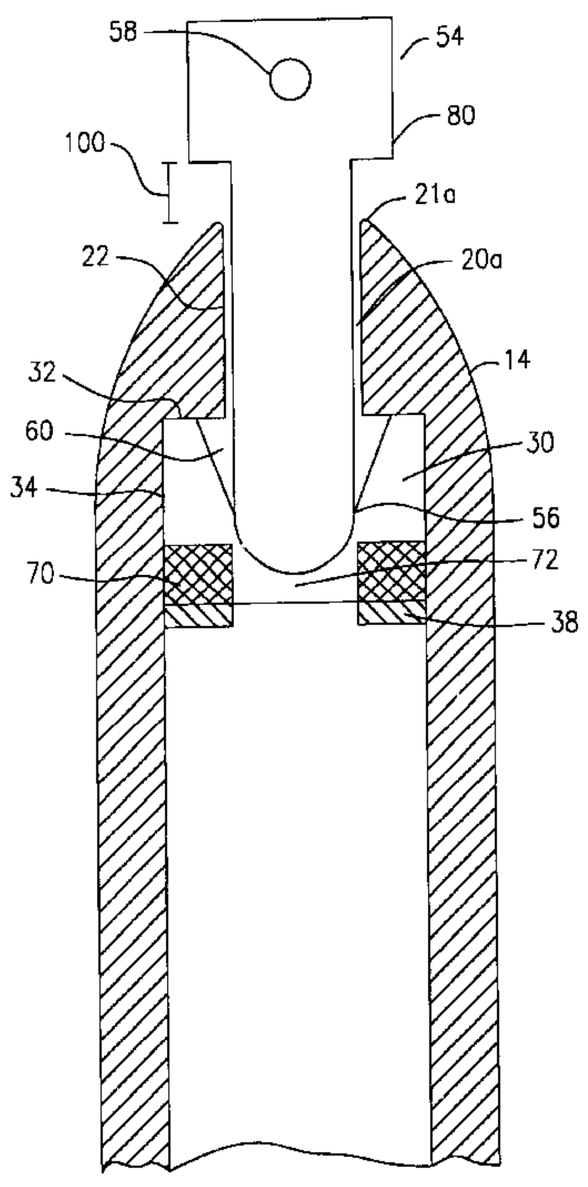
(57) **ABSTRACT**

A locking apparatus attaches a key to a writing instrument. The locking apparatus comprises a barrel having a top end and a bottom end. The top end has a top opening with a first diameter. The second end is attached to the writing instrument. A bore extends inwardly from the top opening. The bore has a second diameter which is larger than the first diameter. A step is formed in the barrel at top of the bore. A post has an upper section and a lower section. The lower section is slidably engaged in the bore. A plurality of tabs is pivotally connected to the lower section of the post. The tabs extend outwardly from the post so that tabs impinge the step. A ring is slidably supported in the bore. The ring has a center hole adapted to frictionally engage the tabs for removing the post from the barrel. A key is connected to the upper section of the post.

**36 Claims, 7 Drawing Sheets**



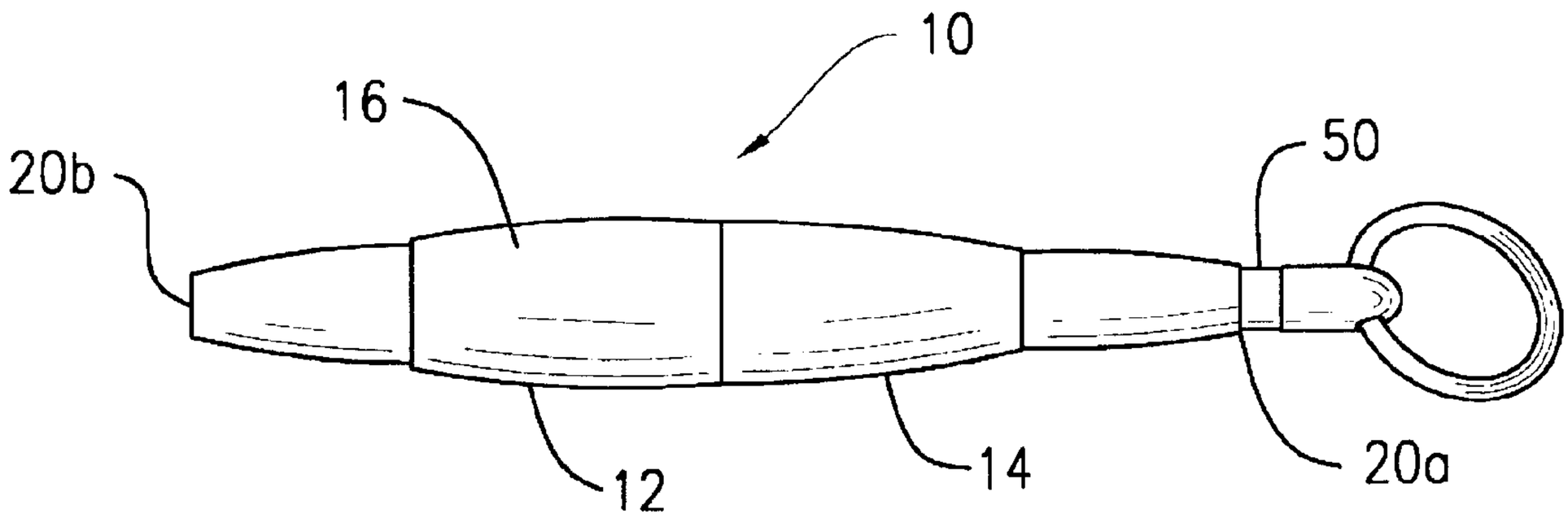



*FIG. 1*

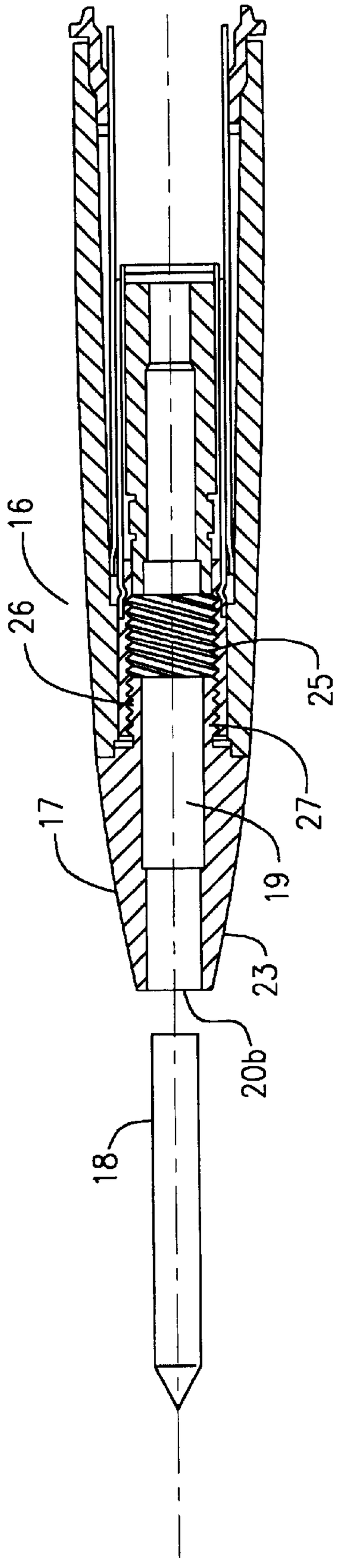



FIG. 2

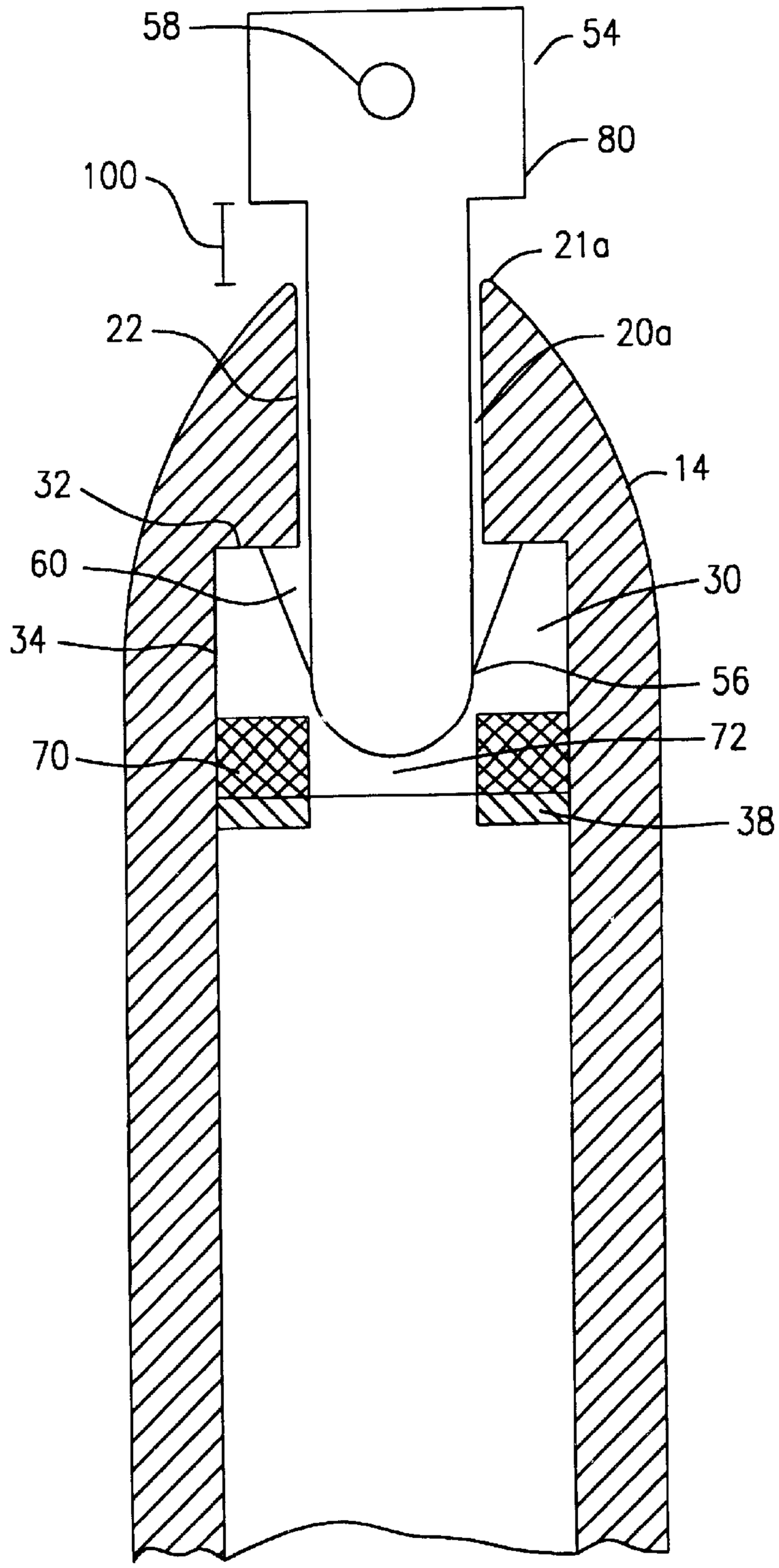



*FIG. 3*

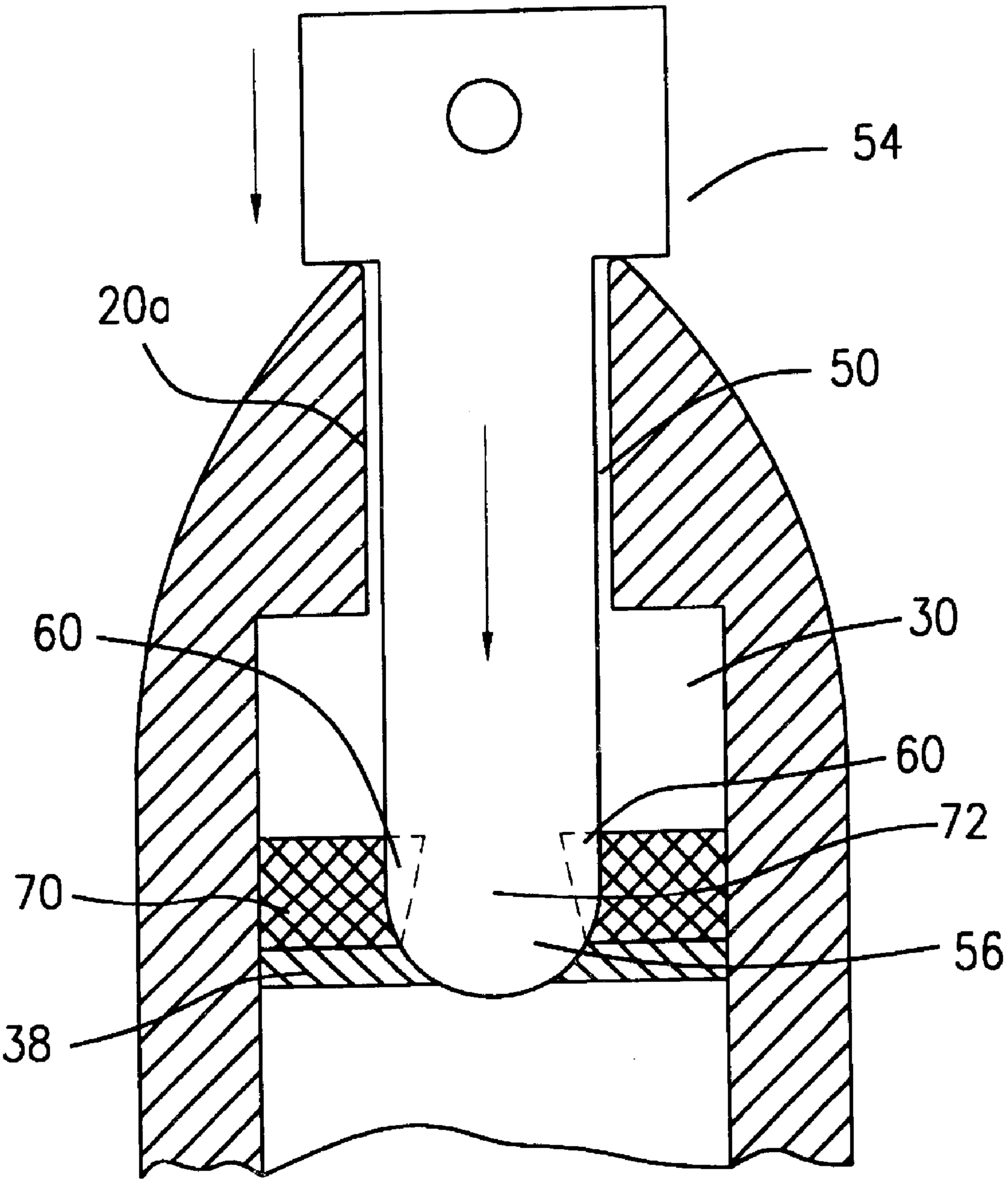



*FIG. 4A*

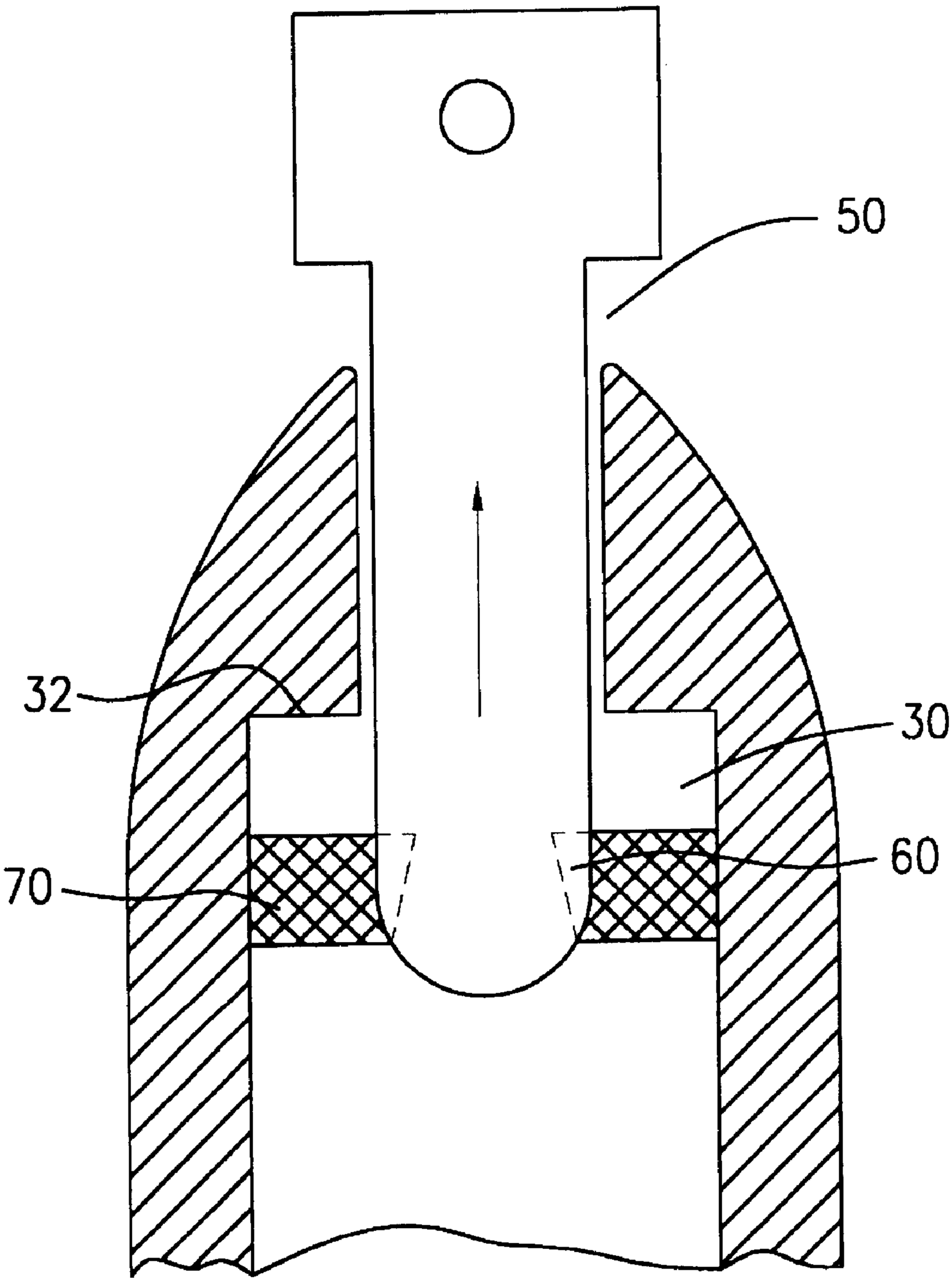



*FIG. 4B*

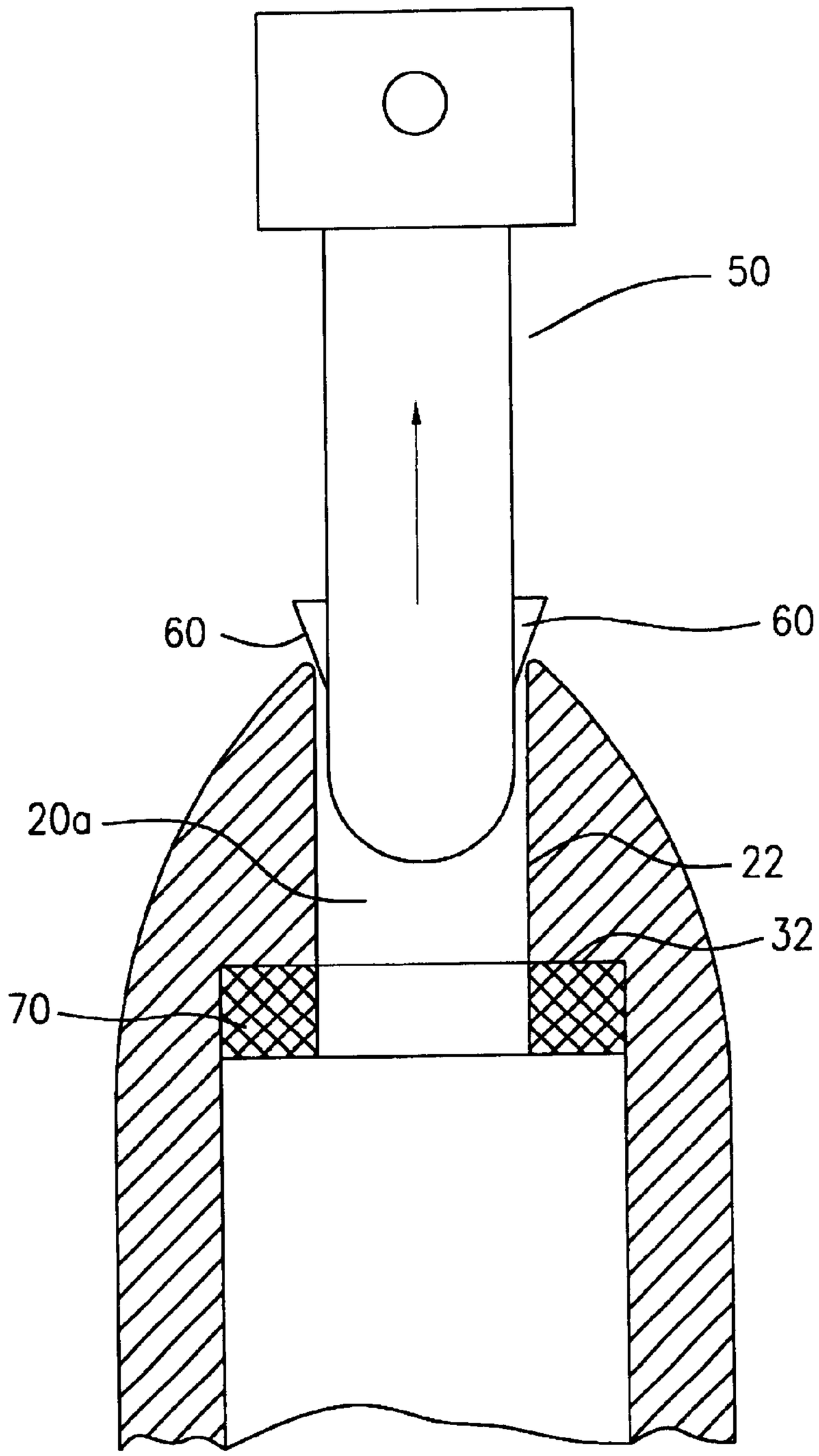



*FIG. 4C*

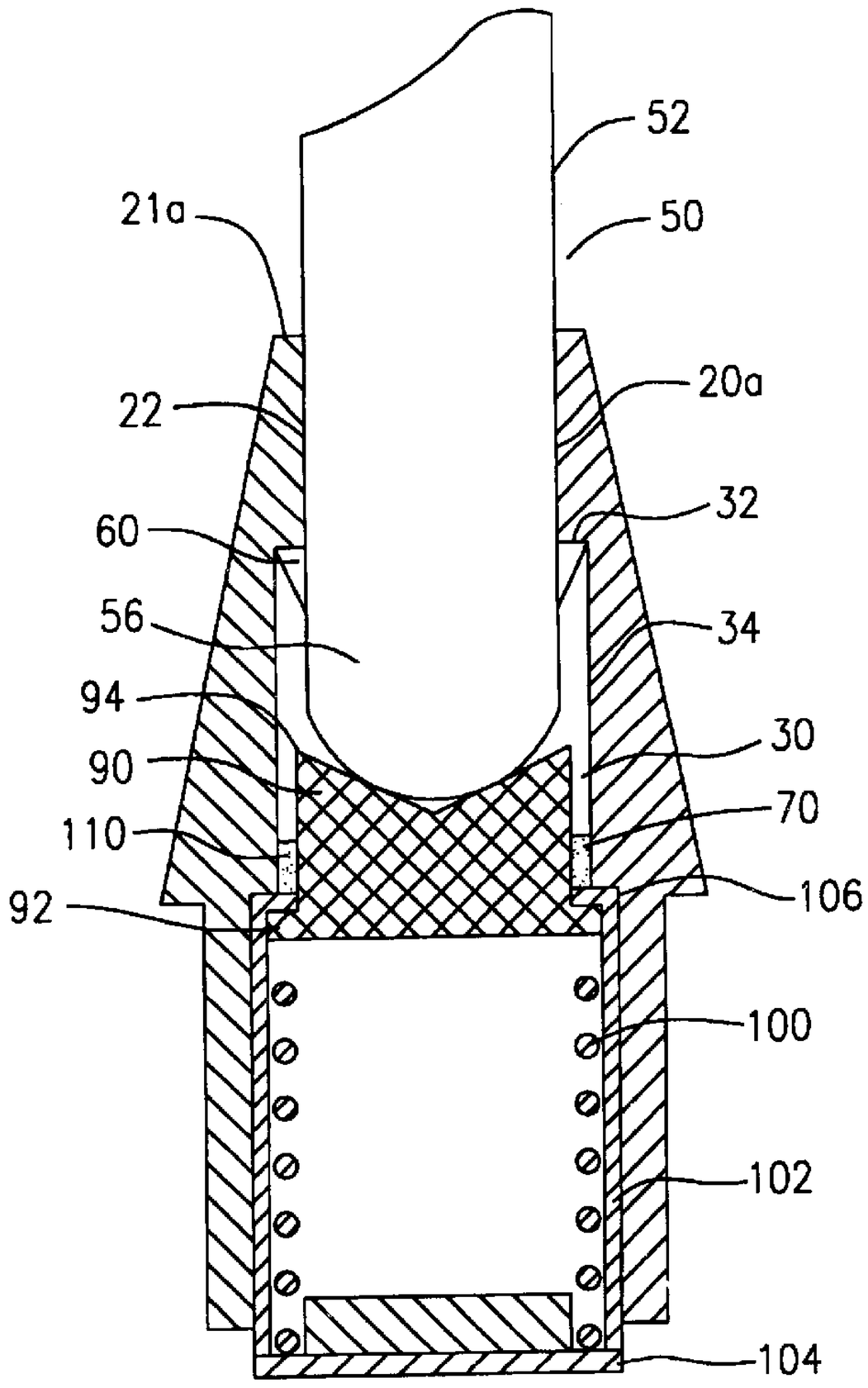

52
21a
50
22
20a
32
60
56
34
94
30
90
70
110
106
92
100
102
104

*FIG. 5*

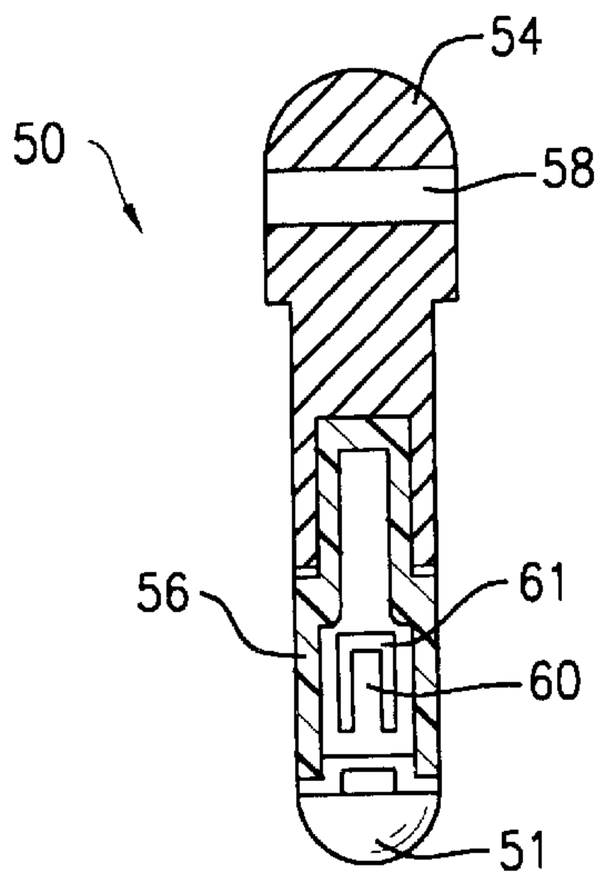

54
50
58
56
61
60
51

*FIG. 6*

# LOCKING APPARATUS FOR A KEY HOLDER

## FIELD AND BACKGROUND OF THE INVENTION

The present invention relates generally to the field of locking devices, and in particular to the field of locking devices for a key holder.

Keys are common items used in everyday life. People carry their keys with them at all times. A variety of key holder designs have been available. However, none of the prior art allows a key to be connected to a key holder by the locking device of the present invention.

The construction of the prior art made attaching and removing key s difficult tasks involving numerous steps. These former key holders used complicated mechanisms comprised of intricate parts susceptible to easy breakage.

Further, none of the prior art allowed for efficient use of limited space in a pocket or bag. They were often awkward and unwieldy and consumed considerable space resulting in little or no space for other items. The former key holders, moreover, had a limited utility since they served the single obvious function—maintaining keys.

U.S. Pat. No. 4,984,442 is directed to a key holder that has a removable sliding pin with an annular notch on its top end and an aperture for holding a key ring on its bottom end. The body of the key holder includes a bottom vertical bore which receives the top end of the pin and a continuous internal passage formed of a first slot which is perpendicular to the bore, a second slot which is above the first slot and also perpendicular to the bore and an open longitudinal recess along the side of the body which extends from the first slot to the second slot. A "J"-shaped plunger is slidably mounted in the internal passage and is accessible from the recess. The plunger engages the notch of the pin so that the pin cannot slide out of the bore. An end cap protrudes from the side opposite the recess and is attached to the plunger by a spring coil. The pin is released by pressing the end cap inward so that the plunger moves in a lateral direction away from the pin.

In addition, U.S. Pat. No. 5,457,976 is for a key holder which operates by pressing down a button that protrudes from a top opening of the housing to release a locked cylindrical rod with an attached key ring from the housing.

A key retainer formed of a steel rod which is inserted into a cap having a magnetized cylindrical cavity is disclosed in U.S. Pat. No. 3,621,690. The rod is held in the cavity by magnetic attraction to the cavity wall. Ball chains for attaching keys are connected to the opposite ends of the rod and cap.

U.S. Pat. No. 5,031,430 discloses a key holder having an upper part that is rotatably attached to a bottom part by a pin. The upper part has an elongated opening for retaining a key ring. When the upper part and bottom part are rotated relative to the other, a concealed gap formed beneath the opening becomes exposed allowing a key to be either attached or removed from the elongated opening.

Further, U.S. Pat. No. 4,407,148 is directed to a key holder consisting of an open-ended key ring removably attached to a "C"-shaped hollow case. The key ring has a gap defined by two facing tips. The case has two notches on opposite sides of its exterior top wall. The tips of the key ring enter the apertures. A plunger is slidably mounted inside the case. A pair of locking ribs extend perpendicular from the top end of the plunger near the apertures. The locking ribs press the tips of the ring against the notches to secure the key ring to the case. The key ring is removed from the case by sliding the plunger so that the locking ribs disengage the tips.



Similarly, U.S. Pat. No. 3,362,201 is directed to a key holder which includes a casing having two apertures located at opposite sides for receiving an open-ended key ring, a plunger having a top loop that protrudes from the top of the casing and a bottom loop within the casing that is inserted through the key ring and a spring coil that forces the plunger upward so that the bottom loop latches against the key ring and prevents it from rotating. The key ring has a gap for inserting or removing a key. The gap is maintained within the casing. A key may be added to the key ring by pressing down on the top loop and rotating the key ring until the gap is exposed.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a a locking apparatus for attaching a key to a writing instrument. The locking apparatus of the invention includes a barrel having a top end and a bottom end, the top end having a top opening, the top opening having a first diameter, and the second end being attached to the writing instrument. A bore extends inwardly from the top opening and has a second diameter which is larger than the first diameter. A step is formed in the barrel at top of the bore and a post having an upper section and a lower section is provided, the lower section being slidably mounted in the bore. A plurality of tabs are pivotally connected to the lower section of the post and the tabs extend outwardly from the post so that the tabs impinge the step to hold the post in the barrel. A ring is slidably supported in the bore, the ring having a center hole adapted to engage the tabs and means are provided for connecting a key to the upper section of the post.

The post is engaged into the barrel by inserting the lower section of the post through the top opening. The tabs extend outwardly before entering the top opening. As the tabs enter the top opening, they are caused to move inwardly by the side wall of the top opening and remain pivoted inwardly as they travel through the latter.

The diameter of the bore is larger than the diameter of the top opening so that when the tabs exit the top opening and enter the bore, they automatically extend outwardly to their original position. The tabs, in their original extended position, impinge the step. Thus, the post remains locked in the barrel.

Disengagement of the post from the barrel occurs when the post is manually pushed down causing the lower section of the post to pass through the center opening of the ring. The tabs are caused to move inwardly when entering the center opening. The tabs press against the inside wall of the center opening to engage the ring. The engagement prevents the tabs from completely passing through the center opening.

The post, along with the engaged ring, is pulled vertically up through the bore. The engaged ring contacts the step which prevents the ring from moving further upward. By continuing to pull the post, the tabs enter the top opening of the barrel and the ring and tabs become disengaged from each other. Once disengaged, the ring falls by gravity to its original supported position in the bore. When the tabs transfer from the ring to the top opening, they are caused to remain pivoted inwardly by the top opening's side wall. Thus, the tabs cannot engage the step. The tabs are also caused to remain pivoted inwardly by the side wall when

traveling through the top opening. The post is pulled up through the top opening until it is completely removed.

It should be understood that the locking apparatus is not limited to connecting a key to a writing instrument. The present invention can be used as a connector for other devices as well. For instance, the locking device can connect a key to a miniature flashlight, a cellular telephone case, pager case, among other various articles.

It is therefore an object of the invention to provide a key holder which is extremely easy and quick for locking a key thereon or releasing the same, which is extremely light in weight yet sturdy, highly durable and long lived.

Another object of the invention is to provide a key holder which is exceedingly simple in construction and inexpensive to manufacture.

Still another object of the invention is to provide a locking device for attaching a key holder to a writing instrument.

Still further another object of the invention is to provide a device for holding keys at one end and for writing at the other end.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference is made to the accompanying drawings and descriptive matter in which a preferred embodiment of the invention is illustrated.

## BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a front plan view of the device;

FIG. **2** is a sectional view of the cross-section of the bottom part of the device;

FIG. **3** is a sectional view of the cross-section of the top part of the device;

FIGS. **4***a, b, c* are sectional views showing the removal of the post from the device;

FIG. **5** is a sectional view of a second embodiment of the device; and

FIG. **6** is a detail of the post.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, in which like reference numerals are used to refer to the same or similar elements, FIG. **1** shows barrel **10** which is provided with first opening **20***a* at the top :end of barrel and second opening **20***b* at the bottom end of barrel. Barrel **10** has outer shell **12** preferably formed of a metal. Barrel **10** also preferably has a short length, approximately in the range of three to four inches.

Barrel **10** is formed of top part **14** and bottom part **16**. Any conventional connection technique can connect parts **14, 16**. For example, either part can be formed with an internal or female thread (not shown) which mates with external or male thread (not shown)provided on the other part thereby locking parts **14, 16** together.

Bottom part **16** of barrel **10** receives a writing implement **18** (not shown), such as an ink cartridge, pencil lead, and so forth. The writing implement is not limited to a marking writing instrument but may also include a non-marking writing instrument, such as a stylus for use on a touch screen device. Writing implement **18** is short in length so that it can be received in bottom part **16**. Tip of writing implement **18** extends through second opening **20***b* when device is used as a writing instrument. The tip may comprise the ball as found in a conventional ballpoint pen, a felt tip, a pencil lead or a non-marking stylus for use, e.g., with a PDA or the like.

Referring to FIG. **2**, bottom part **16** consists of neck **17** having a tapered point **23**. Channel **19** extends longitudinally inward from second opening **20***b*.

Cylindrical sleeve **25** is axially mounted in channel **19** proximate second opening **20***b*. Cylindrical sleeve **25** is rotatably attached to neck **17** so that cylindrical sleeve **25** linearly moves in channel **19** when rotated relative to neck **17**. Cylindrical sleeve **25** preferably has interior male thread **26** and which engages exterior female thread **27** of neck.

Writing implement **18** is front loaded into bottom part **16** of barrel by insertion through second opening **20***b*. Sleeve **25** frictionally engages end of writing implement **18**.

To use the writing instrument, writing tip is retracted through second opening **20***b* by rotating neck **17** relative to sleeve **25**. Neck **17** is rotated in opposite direction to retract writing tip inside neck **17** when writing instrument is not in use.

Other conventional techniques that are available and well within the understanding of those skilled in the art can be used for receiving the writing implement **18** in barrel **10**.

Referring to FIG. **3**, top part **14** of barrel, receives post **50** for securing keys (not shown) to barrel **10**. First opening **20***a* is defined by rim **21***a* and sidewall **22** proximate the top end of barrel **10**. Inner bore **30** extends from and is axially aligned with first opening **20***a*. Inner bore **30** is defined by top wall **32** and interior bore sidewall **34**. Top wall **32** forms a step which separates inner bore **30** from first opening **20***a*. Inner bore **30** has a greater diameter than first opening **20***a*.

Ring **70** having center opening **72** is supported in inner bore **30**. Circular lip **38** preferably extends outward from interior sidewall **34** for supporting ring **70**. Ring **70** has a diameter which is substantially the same as the diameter of inner bore **30** but which permits ring **70** to be slidably movable in a longitudinal direction in inner bore **30**. Ring **70** is preferably formed of metal.

Post **50** has exterior wall **52**, upper section **54** and lower section **56**. Upper section **54** has an aperture **58** for receiving key ring (not shown). Key ring comprises a conventional split key ring which is adapted for receiving one or more keys.

Lower section **56** of post **50** preferably has a round surface. The diameter of lower section **56** is substantially the same as the diameter of central opening **72** of ring **70**.

Flexible tabs **60**, preferably two, extend outwardly from exterior wall **52** proximate lower section **56** of post. Tabs **60** are adapted to move inwardly toward post **50** when pressed.

Tabs **60** are preferably formed by an upside down U-shaped notch formed in exterior wall of post **50**. Tabs are also preferably spaced apart by 180 degrees around post **50**. Tabs **60** may be formed of a thin resilient plastic material such as a high density polyurethane or an acrylic plastic.

Post **50** is received and secured in barrel **10** in the following manner. Lower section **56** of post passes through first opening **20***a*. The diameter of lower section **56** is substantially the same as the diameter of first opening **20***a* so that tabs **60** are pressed inward by sidewall **22**.

Tabs **60** extend outwardly when they exit first opening **20***a* and enter inner bore **30**. Tabs **60** in extended position impinge top wall **32** thereby preventing post **50** from being pulled upward through first opening **20***a*.

Upper section **54** of post **50** preferably has flange **80** which extends circumferentially outward from exterior wall

of post. Flange **80** is located at a selected distance **100** from rim **21***a* when tabs **60** impinge top wall **32**. When post is moved downward for disengagement, flange **80** contacts rim **21***a* and prevents any further longitudinal movement of post **50**. The selected distance **100** is such so that when post **50** is moved and flange **80** contacts rim **21***a*, tabs **60** engage with ring **70**.

Referring to FIG. **4***a*, post **50** is disengaged from barrel **10** by pressing, down upper section **54** of post **50** so that lower section **56** passes through central opening **72** of ring. Tabs **60** enter central opening **72** and move inwardly. Tabs **60** press against side wall of central opening **72** to engage ring **70**.

Referring,to FIG. **4***b*, post **50** is pulled up causing tabs **60** and engaged ring **70** to travel upwardly through bore **30**.

Referring to FIG. **4***c*, ring **70** contacts wall **32** so that ring **70** and tabs become disengaged as post **50** continues upwardly. As tabs **60** enter top opening **20***a*, they are caused to remain pivoted inwardly by sidewall **22** until completely exiting first opening **20***a*.

Referring to FIG. **5**, a second embodiment of the instant invention includes a plunger-spring assembly which allows tabs **60** to remain fixed against top wall **32** when device is in locked position so that post **50** cannot move loosely in inner bore **30**. Plunger **90** is slidably received in inner bore **30**. Plunger **90** has foot **92** which extends circumferentially outward from base of plunger **90**. Plunger **90** has concave depression **94** on its top surface for engaging post **50**.

Foot **92** rests on a biasing means **100** elastically mounted in bore **30**. Biasing means **100** exerts an upward force on plunger **90**. Biasing means may be in form of a spring or a bladder.

Biasing means **100** is preferably mounted in retainer can **102** having top opening **104** which is defined by circular ledge **106** and endcap **104** which covers base of can **102**.

Foot **92** of plunger is positioned in retainer can **102** beneath circular ledge **106**. Biasing means **100** biases plunger **90** to extend through top opening **104** of retainer can **102** and foot **92** to impinge bottom surface of circular ledge **106**.

Passage **110** is formed between side wall of plunger **90**, sidewall **34** of core **30** and top surface of circular ledge **106**. Ring **70** rests in passage **110** on circular ledge **106**. Ring **70** surrounds plunger **90** when device is in a locked position, i.e., tabs **60** impinge top wall **32** of inner bore **30**.

Lower section **56** of post **50** engages concave depression **94** of plunger **90**. Biasing means **100** biases plunger **90** in an upward direction through center opening **72** of ring **70**. Post **50** is forced contemporaneously upward by plunger **90** thereby causing tabs **60** to impinge top wall **32**. The upward force of biasing means **100** causes tabs **60** to remain pressed against top wall **32** so that post **50** cannot move freely in bore **30**.

To disengage post **50**, upper section **54** of. post **50** is pressed down causing downward movement of plunger **90** and compression of biasing means **100**. Tabs **60** enter central opening **72** of ring **70**. Sidewall of central opening **72** presses tabs **60** inwardly thereby causing ring **70** and tabs to become engaged. Post **50** is then removed in the same manner as described above for preferred embodiment of the instant invention.

FIG. **6** illustrates details of one embodiment of post **50** which has a metal cap or upper section **54** that received a plastic, e.g., nylon, lower section **56**. Lower section **56** is hollow and has U-shaped slots **61** that define each tab **60**. To help insert post **50** into the barrel, it also has a round metal nose piece **51** that is fixed to the lower end of lower section **56**.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

**1**. A locking apparatus for attaching a key to a writing instrument, the locking apparatus comprising:

a barrel having a top end and a bottom end, the top end having a top opening, the top opening having a first diameter, the bottom end being attached to the writing instrument;

a bore extending inwardly from the top opening, the bore having a second diameter which is larger than the first diameter;

a step formed in the barrel at a top of the bore;

a post having an upper section and a lower section, the lower section slidably mounted in the bore;

a plurality of tabs movably connected to the lower section of the post, the tabs extending outwardly from the post for engaging the step to retain the post in the barrel;

a ring slidably supported in the bore, the ring having a center hole adapted to engage and move the tabs for removing the post from the barrel; and

a means for connecting a key to the upper section of the post.

**2**. The locking apparatus as claimed in claim **1**, wherein the means for connecting comprises an aperture in the upper section.

**3**. The locking apparatus as claimed in claim **2**, including a key ring received in the aperture.

**4**. The locking apparatus as claimed in claim **1**, further comprising an annular lip extending outwardly from a side wall of the bore for retaining the ring in the bore.

**5**. The locking apparatus as claimed in claim **1**, further comprising:

a plunger extending through the center hole of the ring for engaging the lower section of the post; and

biasing means coupled to the plunger for biasing the post in a direction so that the tabs remain engaged with the step.

**6**. The locking apparatus as claimed in claim **5**, wherein the plunger has a concave surface for engaging the post.

**7**. The locking apparatus as claimed in claim **5**, wherein the plunger has an annular foot extending circumferentially outwardly from the plunger.

**8**. The locking apparatus as claimed in claim **7**, further comprising:

a hollow, cylindrical housing located in the bore for holding the biasing means, the housing having a circular ledge and a housing opening in the housing defined by the circular ledge.

**9**. The locking apparatus as claimed in claim **8**, wherein the ring rests on the circular ledge of the housing.

**10**. The locking apparatus as claimed in claim **8**, wherein the plunger extends through the housing opening and the foot of the plunger impinges under the circular ledge.

**11**. The locking apparatus as claimed in claim **1**, wherein the barrel has a rim that defines the top opening, and the post further comprising:

a flange extending circumferentially outwardly and proximate the upper section of the post, the flange having an outer diameter greater than the first diameter, the flange being spaced from the rim by a selected distance when the tabs are engaged with the step so that when the post

is moved and the flange contacts the rim, the tabs engage with the ring.

**12**. The locking apparatus as claimed in claim **1**, wherein the tabs are formed of plastic.

**13**. The locking apparatus as claimed in claim **1**, wherein the tabs are defined by a U-shaped notch on a surface of the post.

**14**. The locking apparatus as claimed in claim **1**, wherein the tabs are spaced 180 degrees apart around the post.

**15**. The locking apparatus as claimed in claim **1**, wherein the ring has an outer diameter approximately equal to the second diameter.

**16**. The locking apparatus as claimed in claim **1**, wherein the post has a diameter approximately equal to the first diameter.

**17**. The locking apparatus as claimed in claim **1**, wherein the barrel is comprised of two parts that are detachably connected to each other.

**18**. The locking apparatus as claimed in claim **1**, wherein the top end of the barrel has a tapered conical shape.

**19**. A locking apparatus for attaching a key to a writing instrument, the locking apparatus comprising:

a barrel having a top end and a bottom end, the top end having a top opening, the top opening having a first diameter, the second end being attached to the writing instrument;

a bore extending inwardly from the top opening, the bore having a second diameter which is larger than the first diameter;.

a step formed in the barrel at a top of the bore;

a post having an upper section and a lower section, the lower section slidably engaged in the bore;

a plurality of tabs movably connected to the lower section of the post, the tabs extending outwardly from the post for engaging the step to retain the post in the barrel;

a ring slidably supported in the bore, the ring having a center hole adapted to engage and move the tabs for removing the post from the barrel;

a plunger extending upwardly through the center hole of the ring for supporting the lower section of the post, the plunger having an annular foot extending circumferentially outward from the plunger;

a biasing means coupled to the plunger for biasing the post in a direction so that the tabs remain engaged with the step;

a hollow, cylindrical housing located in the bore for holding the biasing means, the housing having a circular ledge, and a housing opening defined by the circular ledge wherein the upper part of the plunger extends through the housing opening and the foot of the plunger impinges under the circular ledge; and

a means for connecting a key to the upper section of the post.

**20**. A connector comprising:

a barrel having a top end, the top end having an opening with a first diameter;

a bore extending inwardly from the opening, the bore having a second diameter which is larger than the first diameter;

a step formed in the barrel at the top of the bore;

a post having an upper section and a lower section, the lower section slidably engaged in the bore;

a plurality of tabs movably connected to the lower section of the post, the tabs extending outwardly from the post for engaging the step to retain the post in the barrel; and;

a ring slidably supported in the bore, the ring having a center hole adapted to engage and move the tabs for removing the post from the barrel.

**21**. The connector as claimed in claim **20**, further comprising an annular lip extending outwardly from a side wall of the bore for retaining the ring in the bore.

**22**. The connector as claimed in claim **20**, further comprising:

a plunger extending through the center hole of the ring for engaging the lower section of the post; and

a biasing means coupled to the plunger for biasing the post in a direction so that the tabs remain engaged with the step.

**23**. The connector as claimed in claim **22**, wherein the plunger has a concave surface for engaging the post.

**24**. The connector as claimed in claim **22**, wherein the plunger has an annular foot extending circumferentially outwardly from the plunger.

**25**. The connector as claimed in claim **24**, further comprising:

a hollow, cylindrical housing located in the bore for holding the biasing means, the housing having a circular ledge and a housing opening in the housing defined by the circular ledge.

**26**. The connector as claimed in claim **25**, wherein the ring rests on the circular ledge of the housing.

**27**. The connector as claimed in claim **25**, wherein the plunger extends through the housing opening and the annular foot of the plunger impinges under the circular ledge.

**28**. The connector as claimed in claim **20**, wherein the barrel has a rim that defines the top opening, and the post further comprises:

a flange extending circumferentially outwardly and proximate the upper section of the post, the flange having an outer diameter greater than the first diameter, the flange being spaced from the rim by a selected distance when the tabs are engaged with the step so that when the post is moved and the flange contacts the rim, the tabs engage the ring.

**29**. The connector as claimed in claim **20**, wherein the tabs are formed of plastic.

**30**. The connector as claimed in claim **20**, wherein the tabs are defined by a U-shaped notch on a surface of the post.

**31**. The connector as claimed in claim **20**, wherein the tabs are spaced 180 degrees apart around the post.

**32**. The connector as claimed in claim **20**, wherein the ring has an outer diameter approximately equal to the second diameter.

**33**. The connector as claimed in claim **20**, wherein the post has a diameter approximately equal to the first diameter.

**34**. A key holder and writing instrument assembly comprising:

a barrel having a top end and a bottom end, the top end having a top opening with a first diameter, the bottom end having a bottom opening;

a bore extending inwardly from the top opening, the bore having a second diameter which is larger than the first diameter;

a step formed in the barrel at the top of the bore;

a post having an upper section and a lower section, the lower section slidably engaged in the bore;

a plurality of tabs movably connected to the lower section of the post, the tabs extending outwardly from the post for engaging the step to retain the post in the barrel;

a ring slidably supported in the bore, the ring having a center hole adapted to engage and move the tabs for removing the post from the barrel;

a means for connecting a key to the upper section of the post; and

a writing implement mounted in the barrel, the writing implement having a tip that extends through the bottom opening.

**35**. The key holder and writing instrument assembly as claimed in claim **34**, wherein the writing implement is rotatable relative to the barrel for actuating axial movement of the writing implement relative to the barrel.

**36**. The key holder and writing instrument assembly as claimed in claim **34**, wherein the writing implement is received into a sleeve within the barrel, the sleeve having an inner spiral thread and being adapted for receiving the writing implement; the writing implement further including a tip at one end of the writing implement which is shaped to be extended and retracted through the bottom opening.

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